FEDS FAIRVIEW EDUCATIONAL SERVICES LTD

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# Unit Standard 30570

## PRACTICE PAPER - ANSWER BANK

**Assessors Note:**
**This answer bank should be used as the primary resource when marking students work. However, responses to some questions may be subjective and tutors are advised to exercise their professional judgement when making assessment decisions.**

**You must complete the assessment instructions on Page 2 before starting this assessment!**

**General Welding**

1. A late model vehicle with EFI (electronic fuel injection) is to have the exhaust repaired using the MIG welding plant. What action should be taken before welding commences? Please circle A, B or C:

   A. Remove all electronics from the vehicle before welding.

   B. Disconnect the battery after the welding task is complete.

   **C.** **Either disconnect the battery or fit an anti-spike device before welding starts.**

2. How can each of the following welding faults be identified:

   Lack of fusion

   **This weld fault is often due to the weld angle of the hand gun or torch pointing more to one side of the parent metal than to the other causing excessive build-up on one side and a lack of weld bead on the other.**

   Excessive spatter

   **Excessive spatter weakens the weld and produces a rough finish. This weld defect has small balls of metal stuck to the parent metal around the weld bead. It also produces a lot of sparks when welding.**

   Lack of penetration

   **This fault produces a shallow fusion between the weld metal and the base metal.**

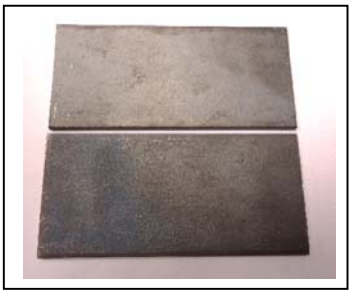
3. Explain why it is important to remove paint, oil, dirt and grease from metals before commencing welding.

   **Failure to remove these materials may result in a weak weld.**

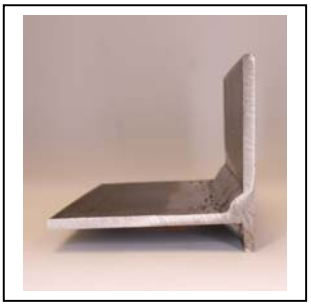
4. Identify and describe each of the following welding joint pictures.

**A plug weld is used to join two pieces of overlaid metal through a drilled hole in the top piece of metal**

**A butt weld joins two pieces of metal together with both pieces butted up to each other**



**A tee weld joins two pieces of metal together at 90°**



**A lap weld joins two pieces of metal welded together with one piece overlaid another.**

**Oxy-acetylene welding**

5. Briefly explain the purpose of each of the following oxy-acetylene welding applications:

**Brazing:** **uses a brass filler rod coated with flux together with an oxy-acetylene torch to join base metals together.**

**Soldering:** **Use a tin/lead alloy to join two metals together without the two materials being melted together.**

6. Identify each of the following components and outline their main function.

**A**: **Component:** Gas Regulator
**Function:** The primary function of a gas regulator is to control gas pressure. It reduces the high pressure of the bottle-stored gas to the working pressure of the torch, and this will be maintained during welding.

**B**: **Component:** Oxy-acetylene Welding Torch Hand Piece
**Function:** Welding tips or a cutting attachment can be used with the handle allowing it to be used for welding, heating and cutting operations.

**C**: **Component:** Welding Tips
**Function:** The welding tip is mounted on the end of the torch handle and through it the oxygen and fuel gas mixture feed the flame. Tips are available in a variety of shapes and sizes to fit almost any welding job and are identified by a number.

7. Match up each welding term with the most appropriate description: For example

**A – Acetylene = 6 – has a garlic like odour**

| | | | | |
|---|---|---|---|---|
| **A** | Acetylene | **A6** | 1 | Process used to prepare material for shaping or to release seized components |
| B | Oxygen pressure regulator | **B8** | 2 | The most commonly used welding pressure setting |
| C | Carburising flame | **C13** | 3 | Removes foreign material from the cylinder valve |
| D | Brazing | **D11** | 4 | Process used to cut through metals |
| E | Neutral flame | **E2** | 5 | Holds components together until they can be fully welded |
| F | Cracking | **F3** | **6** | Has a garlic-like odour |
| G | Flashback | **G12** | 7 | Process used to cool heated steel |
| H | Welding tip | **H9** | 8 | Is colour coded black and has a right hand thread |
| I | Tack weld | **I5** | 9 | Selected according to number and size of hole |
| J | Soldering | **J10** | 10 | Used to join base metals together which have low melting points |
| K | Thermal heating | **K1** | 11 | Welding technique used where metals have a low melting point |
| L | Thermal cutting | **L4** | 12 | Occurs when burning occurs inside the hose |
| M | Quenching | **M7** | 13 | Has more acetylene gas than oxygen gas |

8. Outline the procedure involved in setting up the welding plant for fusion welding.

**1. Select the appropriate tip size for the task.**
**2. Screw the tip onto the end of the torch handle.**
**3. Ensure that both torch handle valves are turned off.**
**4. Open the cylinder valves.**
**5. Open the torch handle oxygen valve.**
**6. Set the correct oxygen pressure.**
**7. Turn off the oxygen torch handle valve.**
**8. Set the correct acetylene pressure.**
**9. Ignite the torch.**
**10. Set correct flame for the task.**

9. Describe the procedure involved when shutting down an oxy-acetylene welding plant after use.

1. **Close the acetylene valve on the torch.**
2. **Once the flame is extinguished the oxygen valve on the torch can then be closed. Undue force should not be used when closing valves or damage can be caused to seatings, threads or spindles.**
3. **Close the acetylene cylinder valve.**
4. **Close the oxygen cylinder valve.**
5. **Each torch valve should now be opened in turn to release the residual pressure in the hoses and regulators.**
6. **Close the torch valves.**
7. **Return the welding equipment to the welding trolley and store in the designated area.**

**MIG welding**

10. Which ONE of the following statements is true? Please circle A, B or C.

**A** **A gas mixture of 80% argon and 20% CO2 is generally used for welding mild steel.**

B A gas bottle is always used when using a flux cored wire.

C Only the gas mixture needs to be changed when welding aluminium from mild steel.

11. Identify each of the following components and outline their main function.

**A**: Component: **Regulator and flow meter**
Function: **Reduces the high cylinder pressure to a usable pressure and is able to adjust and measure the gas flow required.**

**B**: Component: **Wire feed unit**
Function: **When the handgun switch is depressed the feed rollers (which have a groove in them for the correct wire size), pulls the wire from the spool through the rollers and into the centre of the lead. The lead, which is connected to the hand gun, allows the wire to feed down the neck of the hand gun and out to the nozzle tip.**

**C**: Component**:** **Hand gun**
Function: **Allows the user to aim the wire directly at the weld join, allows the user to aim the gas flow directly at the weld join and houses the wire feed motor switch. This switch controls wire feed, gas flow and current flow.**

12. What is the main type of shielding gas used for MIG welding thin metal applications such as mild steel, aluminium and high strength steel?

**Argon**

13. Name three types of shielding gas that are available for MIG welding.

**Argon, Helium, Carbon Dioxide and Oxygen**

14. Name two types of welding joint that can be used when MIG welding on a vehicle.

**Lap weld, Butt weld, tee weld, plug weld.**

15. Explain how reducing the current output of the MIG welder affects the Duty Cycle of the welding machine.

**The duty cycle is the number of minutes out of a ten minute cycle a welding plant can operate before overheating. By reducing the amperage on the plant the duty cycle increases and the welder can operate for longer.**

16. What type of welding wire is used when welding panel steel?

**Copper coated mild steet**

17. Explain the procedure involved in setting up a MIG welding plant.

1. **Chain the shielding gas cylinder securely to the MIG body.**
2. **Crack the cylinder to clear dust or obstructions from the cylinder thread valve.**
3. **Adjust regulator to zero pressure then attach and secure the regulator to the right hand threaded valve of the cylinder**
4. **Open the cylinder valve and using soapy water carry out a leak test of the fittings, thoroughly dry the fittings.**
5. **Switch on the MIG plant.**
6. **Depress the hand gun trigger to activate the wire feed.**
7. **Adjust the regulator adjusting knob to achieve the required shielding gas flow rate**
8. **Set the voltage to the appropriate voltage setting for the work.**
9. **Set the wire speed to the appropriate setting for the work.**

**10. Carry out final adjustments of the settings by welding an earthed practice piece of the material to be welded.**
**11. Ensure that the wire stick out length is correct**

18. Explain the procedure involved in shutting down a MIG welding plant.

**1. Turn the power switch off.**
**2. Turn the shielding gas off at the cylinder valve.**
**3. Switch the power point off and unplug from the socket.**
**4. After the hand gun has cooled, coil the hand gun cable up (do not kink) and hang it on the MIG body.**
**5. Unclamp the earth lead, coil it up and hang on the MIG body.**
**6. Return the MIG plant, welding curtain, welding gloves, helmet and apron to their designated storage areas in the workshop.**

19. Explain why it is important to maintain the correct welding speed when mig welding.

**Hand gun travel speed needs to be sufficient to achieve a good weld. If the operator welds along the join too quickly the work will not heat to the correct temperature and there will be a lack of penetration (weak weld).**
**If the operator's handgun travel speed is too slow the weld produced will be too large needing excessive grinding. Also too much heat may cause the work to buckle or blow a hole.**

20. Explain why it is important to ensure that the weld direction is pushing forward when mig welding.

**The welding direction should be pushing forward as this ensures that the weld area is covered by the shielding gas. If pulled or dragged away, the gas will flow away from the weld area and contamination of the weld may occur.**

21. Explain why it is important to have the correct stick out length when mig welding.

**If it is excessive the shielding gas will be too far away from the weld pool and the air may contaminate the weld. If it is too close there is a chance that the contact tip could be welded to the work.**

**TIG welding**

22. Describe the procedure involved in setting up a GTAW (TIG) welding plant.

**Check that the shielding gas cylinder is secured to the TIG welder body.**
**If the bottle is new or the regulator has been removed the user will have to "crack the cylinder" to clear dust or obstructions from the cylinder thread valve.**
**Adjust the regulator to zero pressure then attach and secure the regulator to the right hand threaded valve of the cylinder.**
**Open the cylinder valve and using soapy water carry out a leak test of the fittings. Ensure that water does not spread to the internal workings of the TIG plant. Where a leak is evident, close off the cylinder and report the leak to your supervisor.**
**Check that the earth cable is plugged in to the negative (––) output on the welder, and the torch (hand piece) cable is plugged in to the positive (+) output.**
**Select the appropriate settings on the TIG plant for the material to be welded.**
**Check that the tungsten electrode wire tip is the correct shape and stick out length, remove and adjust if necessary**
**Switch on the TIG plant.**
**Depress the torch (hand gun) trigger to activate the welder. Adjust the regulator adjusting knob to achieve the required shielding gas flow rate.**

23. What is the purpose of shielding gas?

**When metals are melted in the welding process they become contaminated with different gases in the air, which weaken and lower the quality of the weld. To prevent this Argon based gases are used to surround the weld and prevent the air from contaminating the weld. It is very important to select the gas shielding that provides the best weld characteristics for the metal being welded. Consult with the gas suppliers for specific requirements.**

24. Explain why it is important to adjust the amperage setting before welding.

**The amperage setting on the TIG plant can be adjusted to suit the thickness of the material to be welded. The thicker the material the higher the amperage needs to be.**

**Before welding the operator must consult the reference charts for the recommended amperage for the particular work.**

25. Describe the procedure involved when carrying out TIG welding process.

**To begin the weld the tungsten electrode at the tip of the welding torch is brought within 2 or 3mm of the workpiece and the trigger on the torch start button is applied.**
**Gas will now automatically flow to protect the weld and an electric arc is created.**
**The operator will now create a molten pool by rotating the welding torch on the work piece.**
**Once the arc has created a molten pool, filler rod (the same as the parent metal) can be dabbed into the pool while moving along the weld. The filler rod is usually held at an angle of 15˚ to the molten pool. Once the weld is completed the filler rod is removed and the trigger on the torch is released. The arc will stop but the gas will continue to flow for a few seconds to protect the weld from oxidation while the weld cools.**

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